

REMARKS

The Office Action dated October 26, 2007 has been received and carefully studied.

The Examiner acknowledges the election of Group I, claims 1-12, but incorrectly states that claims 1-12 have been withdrawn. It is claims 13-14 that should be withdrawn (and that were in fact cancelled in Applicant's previous response).

The Examiner rejects claims 1-6 and 9-12 under 35 U.S.C. §103(a) as being unpatentable over Tsubota et al., U.S. Patent No. 5,596,023 in view of Machida et al., JP 06-073164 and further in view of Yamada et al., JP 09-005759, and claims 7-8 as being unpatentable over Tsubota et al. in view of Machida et al. and Yamada, and further in view of Yamamura et al., U.S. Patent No. 6,287,745 and Komano, U.S. Patent No. 6,010,824. The Examiner states that Tsubota discloses a liquid crystal display panel, in which a liquid crystal composition is held between a pair of transparent substrates and the peripheral edges of both the substrates are sealed with a sealing material comprising a partially esterified epoxy (meth)acrylate resin where 10-90% of an equivalent of the epoxy group of a bisphenol A type epoxy resin is (meth)acrylated, a photopolymerization initiator, and a thermosetting agent. The Examiner cites Machida for its disclosure that an organic acid hydrazide compound such as succinic acid dihydrazide, adipic acid dihydrazide and isophthalic acid dihydrazide, can be used as a curing agent. The Examiner uses this teaching to show that these various organic acid

hydrazides are functional equivalents, and one skilled in the art would have found it obvious to substitute the succinic acid dihydrazide or adipic acid dihydrazide of Tsubota with isophthalic acid dihydrazide. Yamada et al. is cited for its disclosure of a heat-curing agent as a solid particulate with an average grain size of 3 μm . Regarding claims 7 and 8, Yamamura is cited for its disclosure of a carbazole-based photopolymerization initiator, and Komano is cited for its disclosure of an acridine-based photopolymerization initiator.

The rejections are respectfully traversed.

Discussion of the Cited References

Tsubota et al. discloses a sealing material for a liquid crystal display panel comprising: (a) a partially esterified epoxy (meth)acrylate resin in which 10-90% of an equivalent of the epoxy group of a bisphenol A type epoxy resin is (meth)acrylated, (b) a photopolymerization initiator, and (c) a thermosetting agent comprising one or more organic acid hydrazide. Further, it exemplifies as the organic acid hydrazide succinic acid dihydrazide, adipic acid dihydrazide and salicylic acid dihydrazide (refer to column 4, lines 9-27), and describes that inorganic fillers may be added (refer to column 4, lines 59-62).

The Examiner points out that Machida et al. discloses as a curing agent of an epoxy resin, succinic acid dihydrazide, adipic acid dihydrazide and isophthalic acid dihydrazide (refer to page 2, paragraph [0005]), all of which are functional equivalent, and

thus a person skilled in the art would have found obvious to substitute succinic acid dihydrazide or adipic acid dihydrazide of Tsubota for isophthalic acid dihydrazide of Machida.

Yamada et al. discloses to use a heat-curing agent having an average grain size of 3 μm or less and an inorganic filler having an average grain size of 1.5 μm or less.

Yamamura et al. and Komano et al. disclose as the photopolymerization initiator carbazole and an acridine-based compound, respectively.

Comparison of the Claimed Invention and the Cited References

The feature of the claimed invention lies in "a sealing material for liquid crystals comprising: (A) as a curing resin a mixture of (a) an epoxy group-containing curing resin and (b) a (meth)acryloyl group-containing curing resin, or (c) a curing resin containing an epoxy group and a (meth)acryloyl group; (B) a radical-forming photopolymerization initiator; (C) an isophthalic acid dihydrazide having an average particle diameter of 3 μm or smaller; and (D) a filler having an average particle diameter of 3 μm or smaller", as defined in claim 1.

The claimed invention is different from Tsubota in that the former specifies as the thermosetting agent an isophthalic acid dihydrazide, while the latter does not specify nor disclose isophthalic acid dihydrazide, and that the former specifies the average diameters of the isophthalic acid dihydrazide and the filler to be 3 μm or smaller, while the latter does not disclose

any average diameter.

Namely, the claimed invention specifies as the curing agent (C) an isophthalic acid dihydrazide having an average particle diameter of 3 μm or smaller. The text of the specification of the captioned application shows the comparative experiments using the thermosetting agents other than the claimed curing agent, wherein Comparative Example 2 using adipic acid dihydrazide, which is used in the working examples in Tsubota and Machida, demonstrates that the adipic acid dihydrazide of the curing agent was eluted in the crystal upon thermal curing, with the result that when cooled, white deposition was formed, which fails to provide a desirable sealing material (refer to page 39, lines 12-18 and Table 1 of the English text of the specification).

On the other hand, the claimed invention selects isophthalic acid dihydrazide as the curing agent to provide a long pot life, a high adhesion strength, a liquid crystal contamination-preventive property and a gap-forming function, which are unpredictable even from the combination of Tsubota, Machida and Yamada et al.

Claims 7-8 are believed to be allowable by virtue of their dependence, as Yamamura et al. and Komano et al. do not supply the above deficiencies of Tsubota, Machida and Yamada et al.

Accordingly, it is believed that claims 1-12 are patentable over the cited references.

Reconsideration and allowance are respectfully requested in view of the foregoing.

Respectfully submitted,


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